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मानक

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IS 5033 (1969): Telescopic Aerials for Portable Radio Receivers [LITD 3: Electromechanical Components and Mechanical Structures for Electronic Equipment]



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“Knowledge is such a treasure which cannot be stolen”

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IS : 5033 - 1969

Indian Standard
SPECIFICATION FOR
TELESCOPIC AERIALS FOR PORTABLE
RADIO RECEIVERS

UDC 621.396.67:621.396.62



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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 1

July 1969

AMENDMENT NO. 1 FEBRUARY 1977
TO
IS : 5033-1969 SPECIFICATION FOR TELESCOPIC
AERIALS FOR PORTABLE RADIO RECEIVERS

Alterations

(Page 8, clause 6.4.4.1) — Substitute ' See Appendix B ' for ' Under consideration '.

(Page 12, Appendix A) — Add the following appendix after Appendix A:

A P P E N D I X B

(Clause 6.4.4.1)

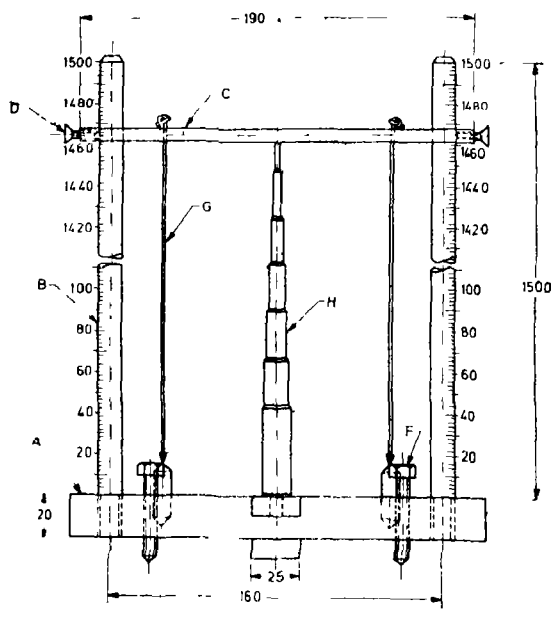
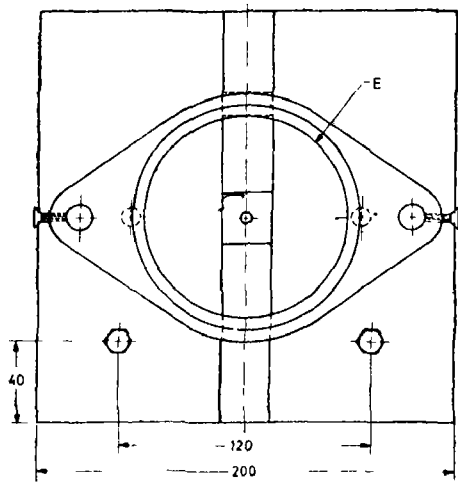
METHOD OF MEASUREMENT OF TOLERANCE FOR
STRAIGHTNESS OF THE TELESCOPIC AERIAL

B-1. DESCRIPTION OF THE MEASURING INSTRUMENT

B-1.1 Figure 1 describes the complete arrangement of the measuring instrument which envisages a base (*A*) over which two pillars (*B*) are fitted. A cross arm (*C*) slides over the two pillars (*B*) and can be set at any position by two fixing screws (*D*). Cross arm (*C*) also carries one transparent round scale (*E*), shown in Fig. 2 separately. This scale can be calibrated so as to give the percentage of straightness with respect to the height of the aerial which can be read through the shadow of the tip of the aerial on the transparent round scale (*E*). Arrangement is also provided for levelling the base (*A*) with the help of two levelling screws (*F*) and two plumb lines (*G*). A separate attachment can be inserted in the base (*A*) so as to accommodate the aerial with female as well as male base.

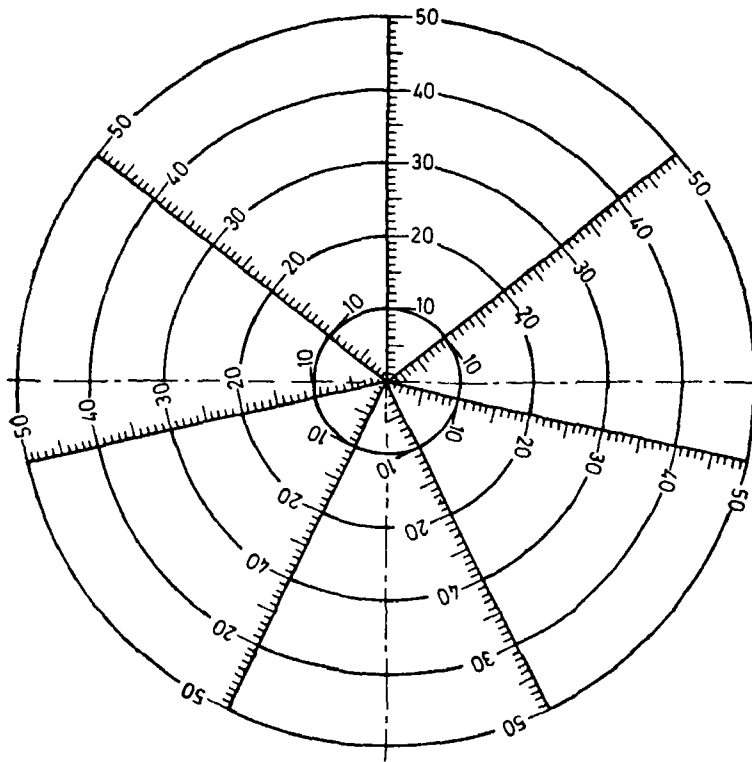
B-2. METHOD OF MEASUREMENT

B-2.1 The aerial (*H*) is kept fixed to the base (*A*). The aerial (*H*) is extended fully and the first section of the aerial (*H*) shall be perpendicular to the base (*A*). The cross arm (*C*) is then taken up and locked at this position by the fixing screws (*D*). The base (*A*) is levelled with respect to the cross arm (*C*) with the help of the two levelling screws (*F*). The percentage of straightness of the aerial (*H*) with respect to the particular height of the aerial is then read out from the calibrated scale (*E*).



All dimensions in millimetres.

FIG. 1 COMPLETE ARRANGEMENT OF THE MEASURING INSTRUMENT



All dimensions in millimetres.

FIG. 2 TRANSPARENT ROUND SCALE

(ETDC 37)

Indian Standard
**SPECIFICATION FOR
 TELESCOPIC AERIALS FOR PORTABLE
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(Continued on page 2)

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Indian Standard
SPECIFICATION FOR
TELESCOPIC AERIALS FOR PORTABLE
RADIO RECEIVERS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 10 March 1969, after the draft finalized by the Electromechanical Components for Electronic Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 This standard deals with physical, mechanical, climatic and electrical aspects to ensure satisfactory operation of telescopic aerials generally intended for portable radio receivers.

0.3 The measurement of radiation pattern will be covered in a separate standard.

0.4 This standard requires reference to IS : 589-1961*, so far as the details of climatic and mechanical testing procedures are concerned, only the relevant degrees of severity have been specified in this standard.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value(s), observed or calculated, expressing the result(s) of a test, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value(s) should be the same as that of the specified value(s) in this standard.

1. SCOPE

1.1 This standard lays down the requirements and methods of test for judging mechanical, electrical, physical and climatic properties of telescopic aerials generally intended for portable radio receivers.

1.2 This standard is not intended for television receivers antennae and automobile receiver antennae.

1.3 This standard does not cover the radiation properties of telescopic aerials.

*Basic climatic and mechanical durability tests for electronic components (*revised*).

†Rules for rounding off numerical values (*revised*)

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2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply in addition to those specified in IS: 1885 (Part XXI)-1967*.

2.1 Telescopic Aerials — Aerials suitable for portable radio receivers and having smooth sliding action of one section into another up to a reasonable number of sections so that the total length of the aerial can be adjusted.

2.2 Base — Fixing device of fixed, sliding, swivel or geared nature to fix the aerial to the receiver.

2.3 Sliding Contacts — Metal clips or spring contacts attached to the bottom of each section for providing electrical connections between the sliding sections.

2.4 Cap — Attachment at the top of the innermost section of the aerial to provide adequate grip for extending and closing of the aerial.

2.5 Routine Tests — Tests carried out on each aerial to check requirements which are likely to vary during production.

2.6 Type Tests — Tests carried out to prove conformity with the requirement of this standard. These are intended to prove the general qualities and design of the given type of telescopic aerial.

2.7 Acceptance Tests — Tests carried out on samples selected from a lot for the purpose of acceptance of the lot.

2.7.1 Lot — Telescopic aerials of the same type and category manufactured by the same factory during the same period.

3. CATEGORIES

3.1 Telescopic aerials shall belong to the category 3 depending upon its ability to withstand the climatic severities as detailed below:

<i>Climatic Test (see IS: 589-1961†)</i>	<i>Severities</i>
Dry heat	70°C
Cold	−10°C
Damp heat (long term)	21 days
Damp heat (accelerated)	2 cycles
Rapid change of temperature	70°C to −10°C
Low air pressure	Not applicable

NOTE — In case of special requirements where the above category cannot be applied, different combinations of climatic severities may be agreed to between the purchaser and the supplier provided that the degrees of severity are chosen from those specified in IS: 589-1961†.

*Electrotechnical vocabulary: Part XXI Aerials

†Basic climatic and mechanical durability tests for electronic components (*revised*).

4. MATERIALS, WORKMANSHIP AND FINISH

4.1 Materials

4.1.1 The telescopic aerials shall be constructed from suitable non-magnetic metal tubes. Sliding contacts shall be of good quality material with high retentivity of shape. The materials shall preferably conform to the relevant Indian Standard, if any.

4.2 Workmanship — All parts of the aerials shall be manufactured and processed in a careful and workmanlike manner in accordance with good engineering practice.

4.3 Finish — The telescopic aerials unless made of stainless steel or aluminium shall be suitably plated. The finish shall not have any pits, roughness and in case of plated surface it shall not have any blisters or unplated areas and shall not be stained or discoloured.

5. MARKING

5.1 Each telescopic aerial shall be clearly and indelibly marked at a suitable part of the aerial with the following information:

- a) Manufacturer's name or trade mark, and
- b) Any other marking, as agreed between the manufacturer and the purchaser.

5.2 Aerials may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

6. TESTS

6.1 Classification of Tests

6.1.1 Type Tests

6.1.1.1 Type approval procedure — The procedure for type approval shall be in accordance with IS : 2612-1965*.

*Recommendation for type approval and sampling procedures for components.

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6.1.1.2 Number of samples—The minimum number of samples of telescopic aerials for type test shall be 26 of each category and type.

6.1.1.3 Sequence of type test—The sequence of type test shall be in accordance with Appendix A.

6.1.2 Acceptance Tests—The acceptance tests shall be carried out on a limited number of samples selected in accordance with the sampling procedure as given in IS:2612-1965* and which have passed the routine test (6.1.3).

Three groups of samples, one for non-destructive test (Group A) and the other two for destructive tests (Group B & Group C), shall be selected in accordance with the Appendix B of IS:2612-1965* and the samples in each group shall be subjected to the following tests in the order given below:

<i>Non-destructive</i>	<i>Destructive</i>	
<i>Group A</i>	<i>Group B</i>	<i>Group C</i>
a) Contact resistance (6.3.1)	a) Dimensions (6.4.1.2)	a) Endurance (6.6)
b) Sliding force (6.4.3)	b) Climatic sequence (6.5.1)	
c) Load test (6.4.6)	c) Test for plating (6.4.5)	

6.1.3 Routine Tests—The following tests shall be carried out on each and every aerial:

- a) General examination (6.4.1.1),
- b) Tolerance for straightness (6.4.4), and
- c) Mechanical rattle (6.4.2).

6.2 General Conditions for Tests

6.2.1 General—The tests shall be carried out on samples as received from the supplier.

6.2.2 Selection of Samples—The samples for testing shall be so selected as to be representative of each type and category.

6.2.3 Atmospheric Conditions for Testing—Unless otherwise specified the test shall be carried out under standard atmospheric conditions as specified in IS:589-1961†.

*Recommendation for type approval and sampling procedures for components.

†Basic climatic and mechanical durability tests for electronic components (*revised*).

6.2.4 Pre-conditioning— Before measurements are made the aerials shall be stored at the measuring temperature for a time sufficient to allow the entire aerial to reach that temperature. The recovery period called for after this conditioning is adequate for the test.

6.2.5 Mounting— Where mounting is specified, the aerial shall be mounted in its normal manner.

6.3 Electrical Tests

6.3.1 Contact Resistance

6.3.1.1 General measuring requirements— The contact resistance may be measured either with direct current or alternating current. In the case of dispute the dc measurement shall govern.

The contact resistance shall normally be calculated from the potential difference measured between the two ends of the fully extended aerial. The wires shall be connected at the two ends by a suitable arrangement providing good electrical contact. The contact shall be made before the measuring voltage is applied.

The emf of the measuring circuit shall not exceed 20 mV dc or ac (peak) and the current shall not exceed 1A.

For ac measurement the frequency shall be $1\text{ Kc/s} \pm 200\text{ c/s}$.

The measuring apparatus shall be such as to ensure an accuracy of $\pm 10\%$.

6.3.1.2 Number of measurements— Three measurements shall be taken. Before each measurement the aerial shall be closed and then fully extended.

6.3.1.3 Deviation from the test method— Any deviation from the specified procedure shall be clearly indicated on the test report.

6.3.1.4 Requirements— The mean value of the three measurements shall not exceed 100 milliohms.

6.4 Mechanical Tests

6.4.1 General Examination and Dimensions

6.4.1.1 General examination— The aerial shall be examined visually from a distance of about 30 cm.

Blisters, pits, roughness and unplated areas or any other surface defects shall not be visible on the surface.

In case glue or solder has been used no residue shall be visible.

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6.4.1.2 Dimensions—The dimensions of the aerial shall be checked and shall conform with the drawings supplied by the supplier.

6.4.2 Mechanical Rattle—Under normal conditions of end use the aerial when fully extended shall not produce any rattle.

6.4.3 Sliding Force—The force required to pull the aerial held vertically down, completely out, starting from entirely pushed-in position as well as the force for reverse manipulation shall be proportionately increasing from the thinnest section to the bottom section. The sliding force for various sections shall be as follows:

- a) *For the thinnest section*—Minimum 100 gf, and maximum 200 gf.
- b) *For the bottom section*—Maximum 1 700 gf, and
Minimum $100 \times N$ gf,
where N = number of moveable sections.
- c) *For the intermediate sections*—Proportionate values.

6.4.3.1 In being pulled out an entirely pushed-in aerial, the thinnest section shall come out first and then the next and so on. For aerials with 7 or more than 7 sections maximum of two skips (two adjoining sections coming out together) shall be permitted. For aerials with less than 7 sections one skip shall be permitted. This shall apply to reverse operation of closing the aerials.

6.4.4 Tolerance for Straightness—Care shall be taken to ensure that individual aerials shall be within the following limits of tolerance for out of straightness:

- a) *For individual section*
Maximum permissible deviation from straightness for one section of aerial is 1 percent of the length of the section.
- b) *For complete aerial*
 - 1) The centre of the cap of the aerial when fully extended shall not deviate from its nominal position by more than 3 percent of the total length of the aerial.
 - 2) If there is a bow, the maximum deviation of any point from its nominal position shall not exceed 3 percent of its distance from the base.

NOTE — For the purpose of these tests, the nominal position is the position where the aerial would have been, if it were straight and vertical

6.4.4.1 Method of measurement—Under consideration.

6.4.5 Test for Plating

6.4.5.1 Adhesion test (file test) — Cut a piece off a plated article, hold it in a vice and apply a coarse file to the cut edge in such a manner as to raise the deposit. There shall be no separation between the coating and the basis material.

6.4.5.2 Thickness of coating — For plated aerials the thickness of coating shall be checked in accordance with IS:4827-1968*.

The thickness of coating shall conform to service Grade 2 of Table 1 of IS:4827-1968*.

NOTE — Service Grade 2, classification number C Ni 10 b Cr r specifies, 10 micron (minimum) of bright nickel and 0.3 micron (minimum) of regular chromium.

6.4.6 Load Test — The base of the fully extended aerial shall be suitably clamped or fixed in the normal manner. A static tensile load of 8 kg is gradually applied to the cap along the axis for a period of 10 minutes.

There shall be no visible deterioration and the aerial shall meet the requirements of **6.4.3**.

6.4.7 Vibration — The fully extended aerial shall be mounted in its normal manner on a vibration table. It shall be subjected to the vibration test in accordance with **7.6** of IS:589-1961†. The amplitude of vibration shall be 0.75 mm, frequency 10-55 c/s for 15 minutes. At the end of the test the aerial shall not have retracted by more than 15 percent of the aerial in entirely pulled out position.

6.4.8 Final Measurement — Contact resistance before and after the test mentioned under **6.4.6** and **6.4.7** shall not exceed that specified in **6.3.1**.

6.5 Climatic Test

6.5.1 Climatic Sequence

6.5.1.1 Dry heat — This test shall be carried out in accordance with **7.2** of IS:589-1961†.

After the specified period of conditioning the aerial shall be removed from the chamber and allowed to remain under standard recovery conditions appropriate to the test.

6.5.1.2 Damp heat accelerated (first cycle) — The aerial shall be subjected to the first cycle of this test in accordance with **7.4** of IS:589-1961†.

After the specified period of conditioning the aerials shall be removed from the chamber and allowed to remain under standard recovery conditions appropriate to the test.

*Specification for electroplated coatings of nickel and chromium on copper and copper alloys

†Basic climatic and mechanical durability tests for electronic components (*revised*).

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6.5.1.3 Cold—This test shall be carried out in accordance with **7.1** of IS: 589-1961* using appropriate degree of severity. While still at the low temperature there shall be a check that the aerial is mechanically operable. The aerial shall then be removed from the chamber and allowed to recover under standard recovery conditions appropriate to this test.

The aerial shall then be visually examined and there shall be no sign of deterioration.

6.5.1.4 Damp heat accelerated (remaining cycle)—The aerial shall be subjected to the remaining one cycle of this test in accordance with **7.4** of IS: 589-1961*.

The aeriels shall then be removed from the chamber and exposed to standard recovery conditions appropriate to the test.

6.5.1.5 Final measurements—At the end of the climatic sequence the aerial shall be subjected to the following tests and shall meet the requirements specified under these tests:

- a) General examination (**6.4.1.1**),
- b) Sliding force (**6.4.3**), and
- c) Contact resistance (**6.3.1**).

6.5.2 Damp Heat (Long Term Exposure)—This test shall be carried out in accordance with **7.3** of IS: 589-1961* using appropriate degree of severity.

The aerial shall then be removed from the chamber and exposed to standard recovery conditions appropriate to this test.

The aeriels shall then be subjected to the following tests and shall meet the requirements specified under these tests:

- a) General examination (**6.4.1.1**),
- b) Sliding force (**6.4.3**), and
- c) Contact resistance (**6.3.1**).

6.5.3 Rapid Change of Temperature— This test shall be carried out in accordance with **7.14** of IS: 589-1961*. The total number of cycles shall be 5.

The aeriels shall then be removed from the chamber and exposed to the standard recovery conditions appropriate to the test.

*Basic climatic and mechanical durability tests for electronic components (*revised*).

The aerials shall then be subjected to the following tests and shall meet the requirements specified under these tests:

- a) General examination (6.4.1.1),
- b) Sliding force (6.4.3), and
- c) Contact resistance (6.3.1).

6.5.4 Salt Mist—This test shall be carried out in accordance with 7.10 of IS:589-1961*, the period of exposure being 4 days. The aerials shall be wiped clean before this test.

The aerials shall then be subjected to the following tests and shall meet the requirements specified under these tests:

- a) General examination (6.4.1.1),
- b) Sliding force (6.4.3), and
- c) Contact resistance (6.3.1).

6.6 Endurance—The aerial shall be mounted in its normal position and subjected to 5 000 operations at the rate of 5 operations per minute. One operation consisting of entirely pulling-out a pushed-in aerial and then pushing it in completely. The compressive force at the end of pushing-in operation and the tensile force at the end of pulling out operation shall be within $2 \text{ kg} \pm 5$ percent.

The aerials shall then be subjected to the following tests and shall meet the requirements specified under these tests:

- a) General examination (6.4.1.1),
- b) Adhesion (file test) (6.4.5.1),
- c) Sliding force (6.4.3),
- d) Mechanical rattle (6.4.2),
- e) Tolerance for straightness (6.4.4), and
- f) Contact resistance (6.3.1).

6.6.1 Aerials with bending mechanism at the base—The aerials shall be further subjected to 5 000 operations of bending at the rate of 5 operations per minute.

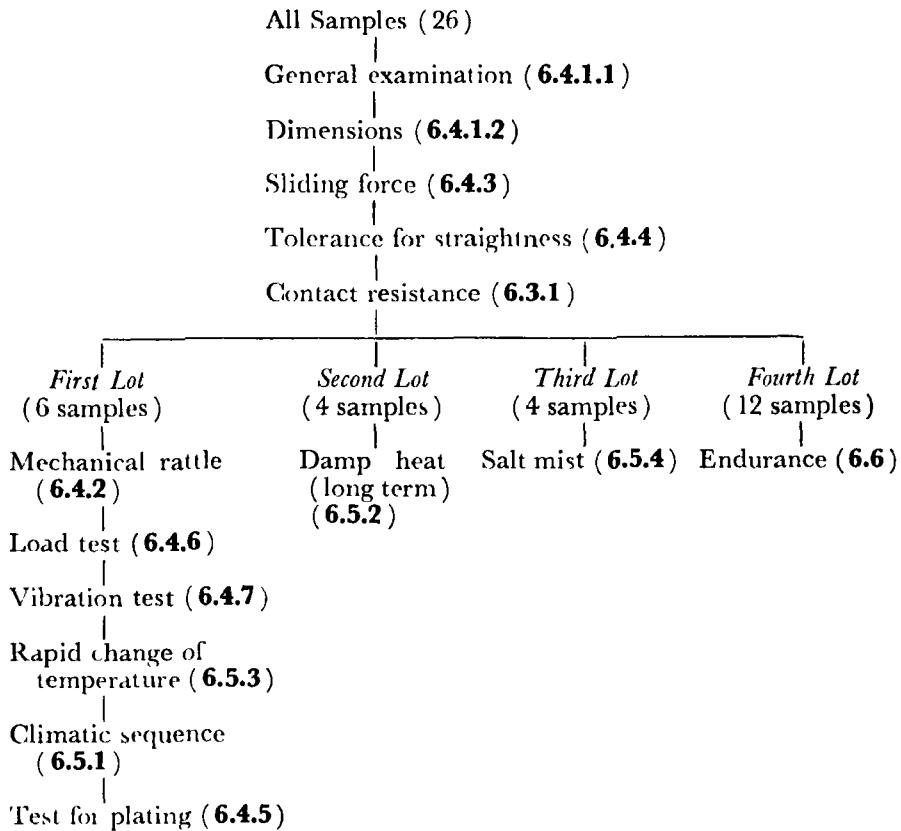
The property of bending shall be retained after the test. There shall be no mechanical damage visible and no moveable section of it will slide down due to gravity when mounted normally and fully extended.

*Basic climatic and mechanical durability tests for electronic components (revised).

A P P E N D I X A

(*Clause 6.1.1.3*)

SEQUENCE OF TYPE TESTS



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Printed at Arcee Press, New Delhi, India